

CALIFORNIA ENERGY COMMISSION
Peak Load Reduction Program
Filter Station, Drip System, and Pump Repair
Den Dulk Farming Co. Project Summary

Project Description:

Located in Selma, California, the den Dulk Farming Co. retrofitted an existing, inefficient sand media separator filtration and micro sprinkler irrigation system and repaired the pump on a 40-acre almond and peach orchard.

The existing pump operated at 45.5% efficiency with the new irrigation equipment. The old filtration system required greater than 35 pounds per square inch (psi) to back flush. It did not handle the primary contaminant load of sand with some oil. Pump discharge pressure was 58 psi at a flow rate of 287 gallons per minute (gpm).

The original micro sprinkler system was divided into four irrigation blocks of 10 acres each, with each irrigated independently due to low flow rate from the inefficient pump. Given the high-pressure requirements at the filter station, the mainline to each of the blocks was sized to reduce the pressure, but this resulted in high friction losses which increased energy costs. During the summer, the system ran continually through peak periods.

The existing system was replaced with efficient sand media filtration and two drip irrigation hoses per tree row. It utilizes the same four blocks, but now irrigating all at the same time. The flow rate to each block was reduced, thereby eliminating high friction losses in the underground system. With the field irrigated as one set and the pump not operating during peak period, peak load is reduced by 16.06 kilowatts. Once repaired, the pump operated at 65.9% efficiency. Pump discharge pressure for the new system is 29 psi at a flow rate of 540 gpm.



Retrofitted filtration station



Old 7-stage pump at 45% efficiency

Project Results:

This facility has a time-of-use meter. Peak load reduction was determined by comparing the utility power bills for the year 2000 and for the 12-month period after the filter station and drip system conversion. Annual kilowatt-hour consumption with the new system was 40,532 with 182 kW-hours required per acre-foot of irrigation water.

Total Project Cost, Drip Retrofit	\$19,785.97
Total Grant Award	\$5,621.00
Contracted Kilowatt Load Reduction	16.06
Actual Kilowatt Load Reduction	16.06

Total Project Cost, Drip Retrofit	\$3,484.29
Total Grant Award	\$1,781.52
Pump Efficiency Pre-Project	45.5%
Pump Efficiency Post-Project	65.9%

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